V. RAGONA.

BAND STRETCHER.

APPLICATION FILED JULY 20, 1918.

1,343,336. **Patented June 15, 1920.**

2 SHEETS—SHEET 1.

Fig. 1.

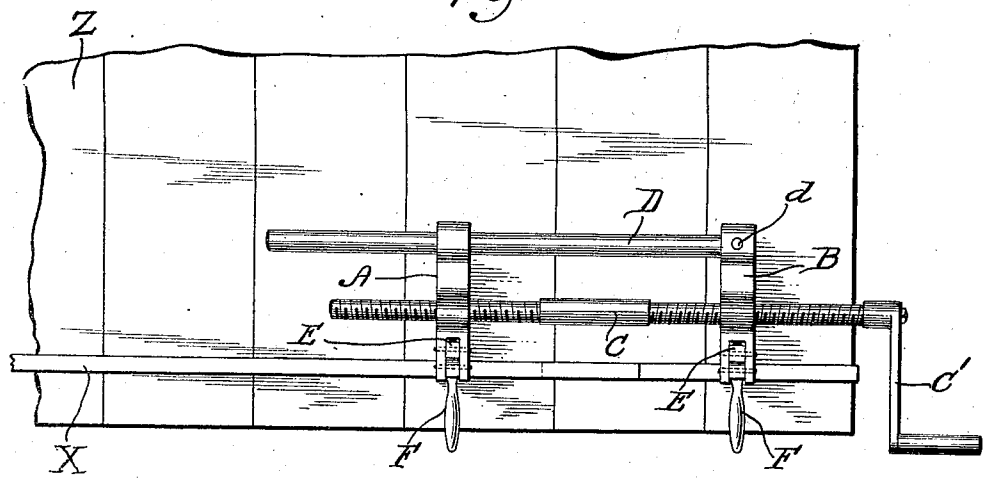


Fig. 2.

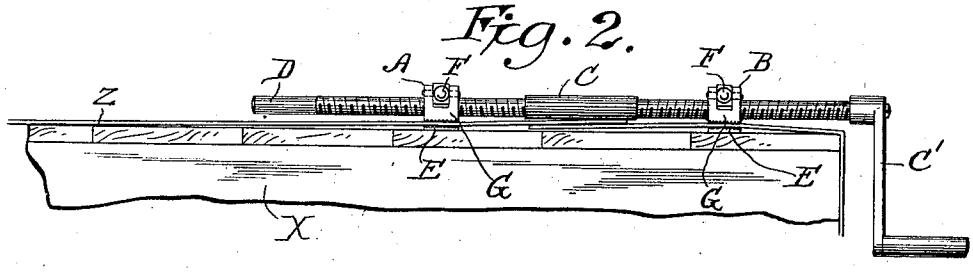


Fig. 4.

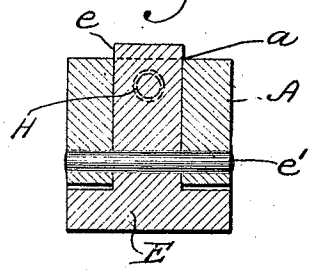
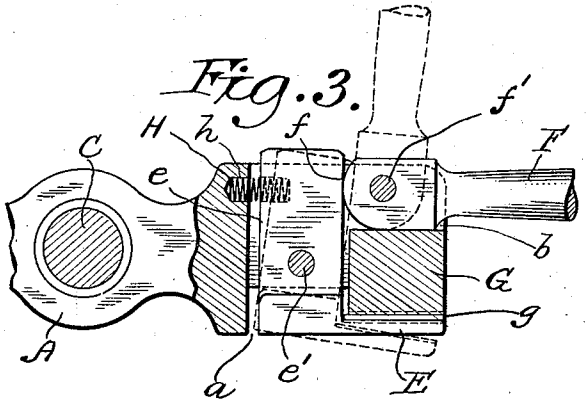


Fig. 3.



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2 SHEETS—SHEET 2.

Fig. 5.

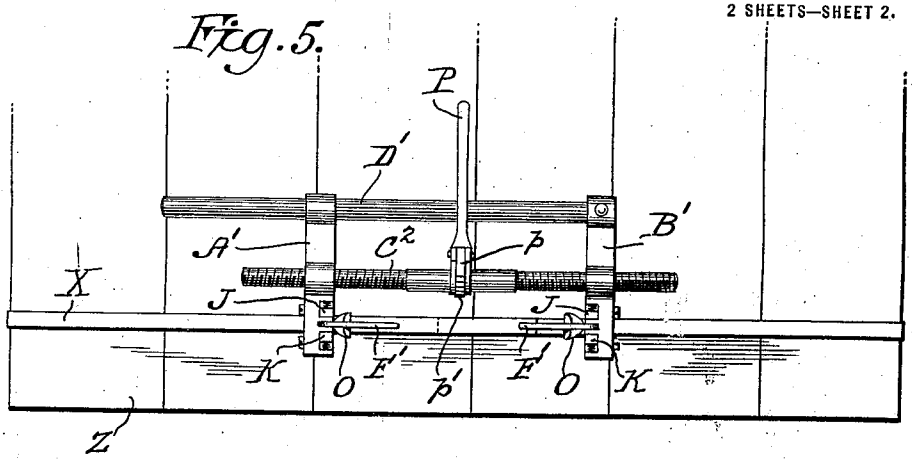


Fig. 6.

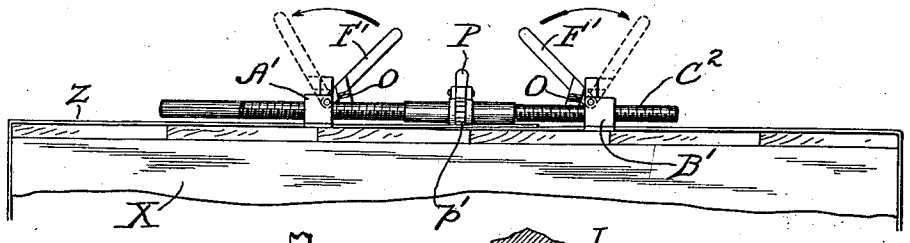


Fig. 7.

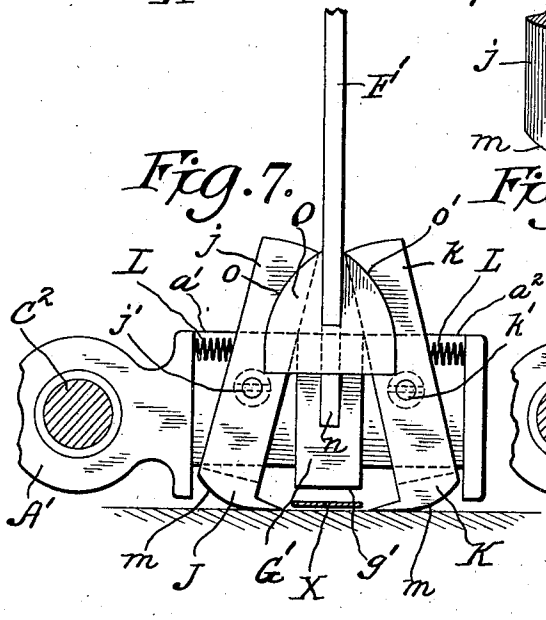


Fig. 9.

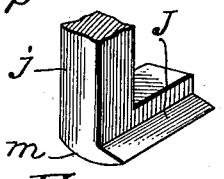


Fig. 8.

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UNITED STATES PATENT OFFICE.

VINCENT RAGONA, OF BROOKLYN, NEW YORK, ASSIGNOR, BY MESNE ASSIGNMENTS, TO CARY MANUFACTURING COMPANY, OF BROOKLYN, NEW YORK, A CORPORATION OF NEW YORK.

BAND-STRETCHER.

1,343,336. Specification of Letters Patent. Patented June 15, 1920.

Application filed July 20, 1918. Serial No. 245,911.

To all whom it may concern:

Be it known that I, VINCENT RAGONA, a citizen of the United States, residing in the city of New York, borough of Brooklyn, county of Kings, and State of New York, have invented a certain new and useful Band-Stretcher, of which the following is a specification.

This invention is an implement for stretching a band around a packing case or box, a bale of material, etc.

The implement of this invention is designed primarily for drawing a metal band or strap, of flat cross section, around a shipping package of one form or another, to the end that the band or strap may be applied so tightly to the package as to bind the same in a secure manner.

The tight application of a flat band to a shipping package is dependent, to a certain extent, upon several conditions, among which are that the band should be gripped and stretched while it remains close to or in contact with the surface of the package, and that the band be stretched by pulling the two end portions toward each other.

The foregoing ends are attained by my invention, the same embodying a plurality of crossheads, and means for moving the same relatively to each other, each of the two crossheads being constructed with a gripper of novel form. Each gripper embodies a fixed jaw the operative face of which is on the under surface of the crosshead, one or more movable jaws the operative face or faces of which are in opposing relation to the similar face of the fixed jaw, and a single manually operative device the pivot of which is separate from the pivotal support of the movable jaw or jaws. Said operating device is a cam lever the eccentric face of which is positioned for contact with a part of the movable jaw or jaws, said lever being shiftable at will and coöperating with the jaw or jaws in a manner to retain the latter in their operating positions, whereby the cam lever so controls the movable jaw or jaws as to securely grip the band against the possibility of the gripper sliding relatively to the band when power is applied for stretching the band.

My stretcher is operated, preferably, with a screw motion, said screw acting to impart movement simultaneously to the crossheads in a manner to draw them together or to move them apart. Experience shows that a band held at one end and pulled at the other end cannot be drawn tightly around a package without resorting to a high carbon steel band which will stand the strain, and, further, the operation requires time and labor. It is apparent that when strain is applied at one end only of the band, it must be drawn around the four corners of a box, hence there is considerable frictional resistance and as a rule the band is not applied sufficiently tight. By pulling upon the two ends of the band the resistance is reduced because there are only two corners to pull around, and the band can be stretched more expeditiously and drawn tighter with less effort, besides enabling the use of a less expensive metal band, thereby securing economy in material, time, and labor.

Other features and advantages of the invention will appear from the following description taken in connection with the drawings, wherein—

Figure 1 is a plan view of my band stretcher showing a preferred form thereof.

Fig. 2 is a side elevation.

Fig. 3 is a vertical section taken lengthwise through a part of one crosshead, the dotted lines showing the non-active position of the gripper.

Fig. 4 is a cross section at right angles to Fig. 3 and taken through the movable jaw in the plane of the pivot thereof.

Fig. 5 is a plan view showing another embodiment wherein each gripper is constructed with a fixed jaw and a plurality of movable jaws.

Fig. 6 is a side elevation of the stretcher shown in Fig. 5.

Figs. 7 and 8 are enlarged views of one of the grippers in the implement of Figs. 5 and 6, Fig. 7 showing the gripper in position ready for closing upon a band, whereas Fig. 8 shows the gripper in closed position for clamping the band against the flat under face of the fixed jaw.

Fig. 9 is a detail perspective view of a portion of one of the movable jaws in the gripper of Figs. 7 and 8.

A, B designate a plurality of crossheads, C a screw spindle, and D a guide stem, said screw spindle and the guide stem being parallel and operating to connect said crossheads A, B in a manner to retain the crossheads in parallel relation to each other.

As shown, the guide stem is attached to one crosshead, as B, by a pin *d*, the stem being fitted in the crosshead A so that the latter may slide freely on said stem.

The screw spindle is provided with a righthand thread for a part of its length and with a lefthand thread for another part of its length, see Figs. 1 and 2. The crosshead A is provided intermediate its ends with a screw threaded opening to receive one part of the spindle C, whereas the other crosshead B is similarly provided with a screw threaded opening of an opposite hand to the thread in the opening of the crosshead A so that the other threaded part of the spindle C will work in the opening of said crosshead B. Suitable means are provided for imparting rotative movement to the screw spindle. A crank C′ is attached to one end portion of the screw spindle, see Figs. 1 and 2, but the means for imparting said rotative movement may consist of a lever adapted for rotating a pawl and ratchet as shown in Figs. 5 and 6 and to be hereinafter described.

The crossheads A, B are equipped with movable jaws E and with cam levers F, said parts being constructed and organized for securely gripping a band while permitting the said band to remain, for all practical purposes, in contact with the surface of a shipping package, or at least to grip the band in quite close relation to the shipping package, so that no appreciable slack will take place in the band after it shall have been drawn taut by the operation of the stretching device.

Each crosshead is constructed for the reception of the gripping jaw and the cam lever, said construction being indicated more particularly in Figs. 3 and 4. The end portion of the crosshead, at the end remote to the stem D, is provided with a slot *a* which extends through the crosshead rearwardly from the extreme terminal portion of said crosshead, thus leaving a certain part of the crosshead solid therewith or in an intact condition; said solid portion constituting a fixed jaw G. The solid part or fixed jaw of the crosshead is cut out or notched as at *b* for the accommodation of the cam lever, and thus each crosshead is provided with a transverse slot *a* and with a notch *b*, the latter opening into the slot as shown in Fig. 3. The fixed jaw G is provided with a gripping face *g*, said gripping face being on the underside of the crosshead *i. e.* the gripping face is on that side of the crosshead which lies in contact with a shipping package when the stretching device is applied to said package for stretching a band around it. In addition to the slot *a* and the notch *b*, the under face of the crosshead is cut away slightly in order to receive the movable jaw E, the gripping face of which jaw is in opposing relation to the gripping face *g* of the fixed jaw G. Said movable jaw E is provided with a shank *e*, the latter extending into or through the slot *a*, as shown more particularly in Figs. 3 and 4. Said movable jaw is connected for pivotal relation with the crosshead by a pin *e′* which passes through the shank of the movable jaw and through the side walls produced in the crosshead by the slot *a* therein, whereby the movable jaw is pivotally attached to the crosshead for its gripping face to be movable relatively to the gripping face of the fixed jaw.

To provide for the ready introduction of the flat band between the gripping faces of the fixed jaw and the movable jaw, it is preferred to employ means for separating the movable jaw from the fixed jaw, said means being shown in Fig. 3 as a spring H which is seated in a socket *h* of the crosshead and is in engagement with the shank *e* of said movable jaw, said spring acting against the movable jaw to move it into the dotted line position of Fig. 3.

The operating means for imparting movement to the jaw *e* against the energy of the spring H is the cam lever F, the latter being mounted in the crosshead independently of the pivotal connection between the jaw E and said crosshead. The lever is provided at one end portion with a cam head *f*, the same being fitted within the notch *b* of the crosshead and being attached to said crosshead by a pivot pin *f′*. The lever is positioned above the fixed jaw G, and a cam face *f* of said lever is in contact with an edge portion of the jaw shank *e*, the spring H acting to press the jaw shank normally into contact with the cam face, see Fig. 3. It will be noted that the cam lever is a separate piece from the movable jaw, and that the movable jaw and the cam lever are separately mounted in the crosshead, whereby the cam lever is adapted to be pressed into operative position so as to impart movement to the movable jaw and to retain or lock said movable jaw in a closed position relatively to the fixed jaw as a result of which the flat band is so firmly gripped between the opposing faces of the two jaws that the crosshead cannot slip relatively to said flat band. As shown in Figs. 1 and 3 the cam levers F extend outwardly from the crossheads A, B when said cam levers are moved to actuate the movable jaws for gripping the band to the crossheads, each cam lever F having an axis of movement parallel to the axis of rotation of the screw spindle for the reason that the fulcrum pins *f′* of the cam levers are parallel to the screw spindle. This organization is advantageous because the cam levers F are out of the way of the operator when after stretching the band, it becomes necessary to manipulate the meeting or lapping end portions of the band, thus

providing ample space between the crossheads and the cam levers within which to conduct the operations necessary to join the lapping end portions of the band.

The operation of the implement shown in Figs. 1 to 4 inclusive, is as follows: A flat metal band X is passed in any suitable way around a packing case Z. The implement is laid upon or against the case, with the cam levers F in raised positions and with jaws E in opened positions as shown by dotted lines in Fig. 3. The operator slips the respective end portions of the band into the spaces between the jaws E, G on the two crossheads A, B, after which the operator presses down upon the levers F, the cam faces of which act on the jaws E so as to turn the latter into the closed positions shown in full lines in Figs. 1, 2, and 3. The end portions of the band are thus gripped to the crossheads A, B. The operator turns the screw spindle which imparts movement simultaneously to the crossheads and the grippers thus drawing the crossheads toward each other and simultaneously applying tension to the band in two directions whereby the end portions of the band are drawn into lapping engagement and said band is put under tension throughout its entire length, as a result of which the band is drawn tightly around the packing case, so as to bind its cross boards into firm contact with its end pieces. The screw has a double action upon the crossheads so as to draw them equally together, and said screw affords means whereby very considerable power is applied to the band in order to draw it tightly, the described operation of stretching the band being performed without lifting the band away from the packing case for an appreciable distance in order that there may be a minimum slackening of the band upon the removal of the implement. The band having been stretched the operator proceeds to couple or unite the lapping end portions of said band, which operation can be easily performed in any suitable way for the reason that the several parts of the implement are so spaced with respect to the lapping band ends as to permit the operator to easily and freely apply the attaching means. The band having been stretched and secured it is only necessary for the operator to lift the cam levers and to withdraw the implement from the band and lift it away from the case, thus releasing the band from engagement with the grippers so that the slight amount of slack in the band will be taken up by the relative movement of the band to the packing case, the net result being that the band is tightly and securely applied.

The implement shown in Figs. 1 to 4, the main difference between the two implements being that each gripper in Figs. 5 to 9 consists of a fixed jaw and two movable jaws. Said implement embodies crossheads A′, B′, a screw spindle C^2 for threaded connection with said crossheads and a stem D′ attached to one crosshead and fitted slidably in the other crosshead. Each crosshead is provided with slots or recesses a', a^2, said slots being separated by an intermediate solid portion of the crosshead, which solid portion constitutes the fixed jaw G′ the gripping face g' of which is on the under side of the crosshead. Each crosshead is equipped with two moving jaws J, K positioned on opposite sides of the fixed jaw G′, said movable jaws being formed with shanks j, k, which shanks are positioned within the recesses or slots a', a^2. The jaws are pivotally attached to the crossheads by pins j', k' and said jaws are engaged by springs L which are suitably attached to the crosshead and act on the shanks of the jaws so as to normally spread them to the open positions shown in Fig. 7. The under faces of the jaws are curved as at m and said jaws extend from the inner edges of the shanks, the extending portions of the jaws being tapering, see Figs. 7 and 8.

The two jaws are actuated simultaneously by a cam lever F′, one end portion of said lever fitting loosely in a recess n provided in the fixed jaw G′, and said lever being fulcrumed to said fixed jaw by a cross pin n' the latter being so positioned that its axis is at a right angle to the axis of rotation of screw C^2. This cam lever F′ is positioned for operation between the shanks j, k of the movable jaws J, K, and said lever is furnished with a cam O, the faces o, o' of which are in contact with the shanks j, k of the movable jaws.

The screw spindle C^2 may, if desired, be rotated by a crank such as the crank C′ of Figs. 1 and 2, but when the band tightener is used on larger packing cases so that it is not expedient to have an end portion of the screw extend beyond the packing case, then it is preferred to employ a rotating lever P which carries a pawl p adapted for engagement with a ratchet p' attached to the screw intermediate the threads thereof, see Figs. 5 and 6.

The operation of the implement shown in Figs. 5 to 9 inclusive is as follows: The band X is passed around the packing case or other shipping package Z and the implement is laid upon said shipping package, the levers F′ being raised and the springs acting to open the jaws of the grippers. The operator adjusts the implement or the band so as to introduce one end portion of the band into the gripper or crosshead A′ whereas the other end portion of the band is positioned in the gripper of the crosshead B′. The operator now presses down upon the cam levers, each lever imparting movement to its cam O which in turn presses

against the shanks *j*, *k* and moves the jaws J, K toward the fixed jaw so that said movable jaws J, K are pressed against the under face of the band and thus the movable jaws grip the band tightly against the under face of the fixed jaw, whereby the two movable jaws coöperate with the fixed jaw in holding the band so tightly in position so that there is no relative movement between the band and the crosshead. The band having been gripped to the respective crossheads, the operator manipulates the lever P so as to impart rotative movement to the screw, and the two crossheads are thus drawn toward each other for the purpose of stretching the band. The band having been stretched to the required extent by drawing simultaneously upon its respective end portions, the operator proceeds to couple or fasten the lapping end portions of the band, after which the cam levers F′ are operated to release the grippers and the implement is removed from the packing case.

Having thus fully described the invention, what I claim as new, and desire to secure by Letters Patent is:

1. In a band stretcher, a plurality of crossheads each provided with a fixed jaw the active face of which is upon the under side of said crosshead, a pivoted jaw movable relatively to said active face of the fixed jaw, a cam lever mounted separately from the pivoted jaw and operable to control the latter, the axes of the movement of the pivoted jaw and the cam lever being parallel and means for imparting relative movement to said crossheads.

2. An implement for stretching flat bands embodying a plurality of crossheads each of which is slotted to produce a fixed jaw the gripping face of which is on the under side of said crosshead, a movable jaw pivoted in the slot of the crosshead for movement relatively to said gripping face, a cam lever pivoted to said crosshead and contacting with the movable jaw, the axes of movement of the pivoted jaw and the cam lever being parallel and means for effecting movement of the crossheads relatively to each other.

3. An implement for stretching flat bands embodying a plurality of crossheads each of which is slotted to produce a fixed jaw the gripping face of which is on the under side of said crosshead, a movable jaw pivoted within the slot of the crosshead and movable relatively to the gripping face of the fixed jaw, a cam lever fulcrumed on the crosshead, said cam lever being mounted independently of the movable jaw and contacting therewith for imparting movement thereto, the axes of movement of the pivoted jaw and of the cam lever being parallel and a screw spindle coöperating with said crossheads for imparting movement simultaneously thereto.

4. An implement for stretching bands embodying a plurality of crossheads each provided with a gripping face on the under side thereof, movable grippers each pivoted to one crosshead for movement relatively to said gripping face, operating members separate from the movable grippers, each operating member being pivoted to the crosshead independently of the attachment of the gripper and positioned for contact with said gripper so as to actuate the latter, the axes of movement of said grippers and of the operating members being parallel, and a screw spindle coöperating with the crossheads for imparting movement simultaneously thereto.

5. An implement for stretching bands embodying a plurality of crossheads each provided with a gripping face on the under side thereof, movable grippers pivoted to one crosshead for movement relatively to said gripping face, operating members separate from the movable grippers, each operating member being pivotally attached to said crosshead for movement on an axis parallel to the axis of movement of the gripper associated therewith and said operating member being positioned for contact with its complemental gripper so as to actuate the latter, and a screw spindle coöperating with said crossheads for imparting movement simultaneously thereto.

6. An implement for stretching bands embodying a plurality of crossheads each provided with a gripping face on the under side thereof, grippers each pivoted to one crosshead for movement relatively to said gripping face, a screw spindle connected with said crossheads for imparting movement simultaneously thereto, and cam levers pivoted to the crossheads to extend outwardly from the same, each cam lever being pivoted for movement on an axis parallel to the axis of movement of the complemental gripper and said cam lever being supported independently of its complemental gripper and being positioned for contact therewith so as to actuate the same.

7. An implement for stretching flat bands embodying a plurality of crossheads each provided with a fixed jaw the gripping face of which is on the under side of the crosshead, a plurality of movable jaws each pivoted to one crosshead for movement relatively to said gripping face of the fixed jaw, a cam lever pivoted to each crosshead and positioned for contact with said jaws for imparting movement simultaneously thereto, the axes of movement of the cam lever being substantially parallel to the axis of movement of the jaw complemental to said cam lever, and means for effecting relative movement between said crossheads.

8. In an implement for stretching bands, a plurality of crossheads each provided with

a fixed gripping face and with a plurality of movable jaws the gripping faces of which are in coöperative relation to said fixed gripping face, and a cam lever pivoted intermediate said movable jaws and positioned for contact therewith to impart movement simultaneously thereto, combined with means for effecting relative movement between said crossheads.

9. In a band stretcher, a crosshead provided with a fixed gripping face and with a plurality of movable jaws positioned for movement relatively to said gripping face, and a cam lever contacting with said jaws and operable for imparting movement simultaneously thereto.

In testimony whereof, I have hereunto signed my name at Brooklyn, New York, this 18th day of July, 1918.

VINCENT RAGONA.